

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Yasushi NOGUCHI et al.

Attn: PCT Branch

Application No. New U.S. National Stage of PCT/JP03/04623

Filed: October 1, 2004

Docket No.: 121337

For: HONEYCOMB STRUCTURE PRODUCING METHOD, AND HONEYCOMB
STRUCTURE

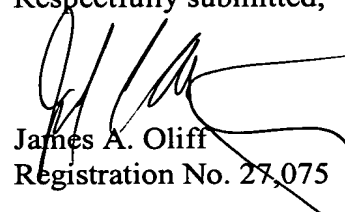
**TRANSLATION OF THE ANNEXES TO THE
INTERNATIONAL PRELIMINARY EXAMINATION REPORT**

Commissioner for Patents
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Sir:

Attached hereto is a translation of the annexes to the International Preliminary Examination Report (Form PCT/IPEA/409). The attached translated material replaces the material in the specification on pages 2 through 5 and the claims.

Respectfully submitted,


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honeycomb structure comprising the cell structure provided with the outer wall on the outer peripheral surface thereof, characterized in that the cell structure being provided with a material for forming outer wall is produced by using the cell
5 structure and the material for forming outer wall which are combined so that the absolute value of the difference between the proportion of shrinkage in the size of the cell structure shrinkage after firing to the size of the cell structure before firing and the proportion of shrinkage in the size of the
10 material for forming outer wall after firing to the size of the material for forming outer wall before firing is not more than 0.5%, and the resulting cell structure being provided with a material for forming outer wall is fired." of Claim 1 on page 20 is amended to read "A method for producing a honeycomb
15 structure which comprises disposing a material for forming outer wall forming an outer wall upon firing on the outer peripheral surface of a cell structure having a plurality of cells serving as fluid flowing channels and partitioned by partition walls to produce a cell structure being provided with
20 a material for forming outer wall and firing the resulting cell structure being provided with a material for forming outer wall to obtain a honeycomb structure comprising the cell structure provided with the outer wall on the outer peripheral surface, characterized in that in order to obtain, as the material for
25 forming outer wall, such a material that the absolute value of the difference between the proportion of shrinkage in the size of the cell structure after firing to the size of the cell structure before firing and the proportion of shrinkage in the

size of the material for forming outer wall after firing to the size of the material for forming outer wall before firing is not more than 0.5% in the relation between the material of the cell structure and the material for forming outer wall, the material for forming outer wall is prepared using at least one material selected from the group consisting of talc, calcined talc, kaolin, calcined kaolin, alumina, aluminum hydroxide, mullite and silica so that the material for forming outer wall after firing contains cordierite as a main component and contains a quartz powder in an amount of 1-15% by mass based on the whole material for forming outer wall, and the cell structure being provided with a material for forming outer wall is produced using the thus prepared material for forming outer wall and is fired." Furthermore, "A honeycomb structure comprising a cell structure provided with an outer wall on the outer peripheral surface thereof which is produced by firing a cell structure being provided with a material for forming outer wall comprising a cell structure having a plurality of cells serving as fluid flowing channels and partitioned by partition walls and a material for forming outer wall which is disposed on the outer peripheral surface of the cell structure and forms an outer wall upon firing on the cell structure, characterized in that the absolute value of the difference between the proportion of shrinkage in the size of the cell structure after firing to the size of the cell structure before firing and the proportion of shrinkage in the size of the material for forming outer wall after firing to the size of the material for forming outer wall before firing is not more than

0.5%." of Claim 19 on page 22 is amended to read "A honeycomb structure comprising a cell structure provided with an outer wall on the outer peripheral surface thereof which is produced by firing a cell structure being provided with a material for forming outer wall comprising a cell structure having a plurality of cells serving as fluid flowing channels and partitioned by partition walls and a material for forming outer wall which is disposed on the outer peripheral surface of the cell structure and forms an outer wall upon firing on the cell structure, characterized in that the outer wall comprises such a material that the absolute value of the difference between the proportion of shrinkage in the size of the cell structure after firing to the size of the cell structure before firing and the proportion of shrinkage in the size of the material for forming outer wall after firing to the size of the material for forming outer wall before firing is not more than 0.5%, and the outer wall contains at least one material selected from the group consisting of talc, calcined talc, kaolin, calcined kaolin, alumina, aluminum hydroxide, mullite and silica so that the material for forming outer wall after firing contains cordierite as a main component and contains a quartz powder in an amount of 1-15% by mass based on the whole of the material for forming outer wall."

(2) In view of the above amendment of claim 1, claims 8 and 9 are deleted. Furthermore, in view of the deletion of claims 8 and 9, the cited preceding claims in dependent claims 10-18 are amended to conform with the deletion of the claims. Moreover, in view of the amendment of claim 19, claims 26 and

27 are deleted. In addition, in view of the deletion of claims 26 and 27, the cited preceding claims in dependent claims 28-36 are amended to conform with the deletion of the claims.

5 6. Appendixes:

(1) Pages 20-24 (translator's remarks: corresponding to Pages 33 to 41) of claims

Claims

1. (Amended) A method for producing a honeycomb structure which comprises disposing a material for forming
5 outer wall forming an outer wall upon firing on the outer peripheral surface of a cell structure having a plurality of cells serving as fluid flowing channels and partitioned by partition walls to produce a cell structure being provided with a material for forming outer wall and firing the resulting cell
10 structure being provided with a material for forming outer wall to obtain a honeycomb structure comprising the cell structure provided with the outer wall on the outer peripheral surface, characterized in that in order to obtain, as the material for forming outer wall, such a material that the absolute value of
15 the difference between the proportion of shrinkage in the size of the cell structure after firing to the size of the cell structure before firing and the proportion of shrinkage in the size of the material for forming outer wall after firing to the size of the material for forming outer wall before firing is
20 not more than 0.5% in the relation between the material of the cell structure and the material for forming outer wall, the material for forming outer wall is prepared using at least one material selected from the group consisting of talc, calcined talc, kaolin, calcined kaolin, alumina, aluminum hydroxide,
25 mullite and silica so that the material for forming outer wall after firing contains cordierite as a main component and contains a quartz powder in an amount of 1-15% by mass based on the whole material for forming outer wall, and the cell structure being provided with a material for forming outer wall
30 is produced using the thus prepared material for forming outer wall and is fired.

2. A method for producing a honeycomb structure according to claim 1, wherein the main component of the cell structure and/or outer wall is a ceramics.

35 3. A method for producing a honeycomb structure according to claim 1 or 2, wherein the cell structure being provided with a material for forming outer wall is produced so

that the absolute value of the difference between the coefficient of thermal expansion of the cell structure after firing and that of the outer wall after firing is not more than $0.7 \times 10^{-6}/^{\circ}\text{C}$.

5 4. A method for producing a honeycomb structure according to any one of claims 1-3, wherein the cell structure being provided with a material for forming outer wall is produced so that the main component of the cell structure after firing becomes cordierite.

10 5. A method for producing a honeycomb structure according to any one of claims 1-4, wherein the cell structure is unfired, the material for forming outer wall is disposed on the outer peripheral surface of the unfired cell structure to produce the cell structure being provided with a material for
15 forming outer wall, and the resulting cell structure being provided with a material for forming outer wall is fired.

 6. A method for producing a honeycomb structure according to any one of claims 1-4, wherein the cell structure is previously fired, the material for forming outer wall is
20 disposed on the outer peripheral surface of the fired cell structure to produce the cell structure being provided with a material for forming outer wall, and the resulting cell structure being provided with a material for forming outer wall is fired.

25 7. A method for producing a honeycomb structure according to any one of claims 1-6, wherein the material for forming outer wall which forms the outer wall mainly composed of cordierite by firing is disposed.

8. (Deleted)

9. (Deleted)

10. (Amended) A method for producing a honeycomb
5 structure according to any one of claims 1-7, wherein the cell
structure being provided with a material for forming outer wall
is produced by using the cell structure and the material for
forming outer wall combined so that the absolute value of the
difference between the proportion of shrinkage in the size of
10 the cell structure after firing to the size of the cell
structure before firing and the proportion of shrinkage in the
size of the material for forming outer wall after firing to the
size of the material for forming outer wall before firing is

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not more than 0.3%, and the resulting cell structure being provided with a material for forming outer wall is fired.

11. (Amended) A method for producing a honeycomb structure according to any one of claims 1-7 and 10, wherein
5 the cell structure being provided with a material for forming outer wall is produced so that the absolute value of the difference between the thermal expansion coefficient of the cell structure after firing and that of the outer wall after firing is not more than $0.4 \times 10^{-6}/^{\circ}\text{C}$.

10 12. (Amended) A method for producing a honeycomb structure according to any one of claims 1-7, 10 and 11, wherein the maximum diameter of a section formed by cutting the cell structure after firing along a plane perpendicular to the central axis is 150 mm or more.

15 13. (Amended) A method for producing a honeycomb structure according to any one of claims 1-7 and 10-12, wherein the outer peripheral surface of the cell structure is formed of the surface of the outer peripheral wall provided on the outside of the cells positioned at the outermost periphery
20 among a plurality of the cells.

14. (Amended) A method for producing a honeycomb structure according to any one of claims 1-7 and 10-12, wherein the outer peripheral surface of the cell structure is formed of the surface of the partition walls of the cells positioned
25 at the outermost periphery among a plurality of the cells.

15. (Amended) A method for producing a honeycomb structure according to any one of claims 1-7 and 10-12, wherein the outer peripheral surface of the cell structure is formed by grinding

at least a part of the outer peripheral wall of the cell structure comprising a plurality of cells serving as fluid flowing channels and provided with the outer peripheral wall on the outside of the cells positioned at the outermost periphery among a plurality of the cells.

16. (Amended) A method for producing a honeycomb structure according to any one of claims 1-7 and 10-15, wherein the surface of the outer wall of the honeycomb structure is subjected to a surface working.

17. (Amended) A method for producing a honeycomb structure according to any one of claims 1-7 and 10-16, wherein the honeycomb structure is cylindrical and the difference between the maximum diameter and the minimum diameter of the cylindrical honeycomb structure is not more than 1 mm.

18. (Amended) A method for producing a honeycomb structure according to claims any one of 1-7 and 10-17, wherein kaolin is used as the raw material for the cell structure and the material for forming outer wall and the average particle diameter of kaolin used as the material for forming outer wall is $1/10$ or more and $1/2$ or less of the average particle diameter of kaolin used as the raw material for the cell structure.

19. (Amended) A honeycomb structure comprising a cell structure provided with an outer wall on the outer peripheral surface thereof which is produced by firing a cell structure being provided with a material for forming outer wall comprising a cell structure having a plurality of cells serving as fluid flowing channels and partitioned by partition walls and a material for forming outer wall which is disposed on the outer

peripheral surface of the cell structure and forms an outer wall upon firing on the cell structure, characterized in that the outer wall comprises such a material that the absolute value of the difference between the proportion of shrinkage in the size of the cell structure after firing to the size of the cell structure before firing and the proportion of shrinkage in the size of the material for forming outer wall after firing to the size of the material for forming outer wall before firing is not more than 0.5%, and the outer wall contains at least one material selected from the group consisting of talc, calcined talc, kaolin, calcined kaolin, alumina, aluminum hydroxide, mullite and silica so that the material for forming outer wall after firing contains cordierite as a main component and contains a quartz powder in an amount of 1-15% by mass based on the whole of the material for forming outer wall.

20. A honeycomb structure according to claim 19, wherein the main component of the cell structure and/or outer wall is a ceramics.

21. A honeycomb structure according to claim 19 or 20, wherein the absolute value of the difference between the coefficient of thermal expansion of the cell structure after firing and that of the outer wall after firing is not more than $0.7 \times 10^{-6}/^{\circ}\text{C}$.

22. A honeycomb structure according to any one of claims 19-21; wherein the main component of the cell structure after firing is cordierite.

23. A honeycomb structure according to any one of claims 19-22, wherein the cell structure is unfired, and the cell structure being provided with a material for forming outer wall comprising the unfired cell structure and the material for forming outer wall disposed on the outer peripheral surface of the unfired cell structure is fired to produce the honeycomb structure.

24. A honeycomb structure according to any one of claims 19-22, wherein the cell structure being provided with a

material for forming outer wall comprising the previously fired cell structure and the material for forming outer wall disposed on the outer peripheral surface of the fired cell structure is fired to produce the honeycomb structure.

5 25. A honeycomb structure according to any one of claims 19-24, wherein the main component of the outer wall after firing is cordierite.

 26. (Deleted)

 27. (Deleted)

10 28. (Amended) A honeycomb structure according to any one of claims 19-25, wherein the cell structure being provided with a material for forming outer wall is produced so that the absolute value of the difference between the proportion of shrinkage in the size of the cell structure after firing to the size of the
15 cell structure before firing and the proportion of shrinkage

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in the size of the material for forming outer wall after firing to the size of the material for forming outer wall before firing is not more than 0.3%.

29. (Amended) A honeycomb structure according to any
5 one of claims 19-25 and 28, wherein the absolute value of the difference between the coefficient of thermal expansion of the cell structure after firing and that of the outer wall after firing is not more than $0.4 \times 10^{-6}/^{\circ}\text{C}$.

30. (Amended) A honeycomb structure according to any
10 one of claims 19-25, 28 and 29, wherein the maximum diameter of the cell structure in a section formed by cutting the cell structure after firing along a plane perpendicular to the central axis is not less than 150 mm.

31. (Amended) A honeycomb structure according to any
15 one of claims 19-25 and 28-30, wherein the outer peripheral surface of the cell structure is formed of the surface of the outer peripheral wall provided on the outside of the cells positioned at the outermost periphery among a plurality of the cells.

20 32. (Amended) A honeycomb structure according to any one of claims 19-25 and 28-30, wherein the outer peripheral surface of the cell structure is formed of the surface of the partition walls of the cells positioned at the outermost periphery among a plurality of the cells.

25 33. (Amended) A honeycomb structure according to any one of claims 19-25 and 28-30, wherein the outer peripheral surface of the cell structure is formed by grinding at least a part of the outer peripheral wall of the cell structure comprising a plurality of cells serving as fluid flowing
30 channels and provided with

the outer peripheral wall on the outside of the cells positioned at the outermost periphery among a plurality of the cells.

34. (Amended) A honeycomb structure according to any one of claims 19-25 and 28-30, wherein the surface of the outer
5 wall of the honeycomb structure provided with the outer wall on the outer peripheral surface of the cell structure is subjected to a surface working.

35. (Amended) A honeycomb structure according to any one of claims 19-25 and 28-34, wherein the honeycomb structure
10 is cylindrical and the difference between the maximum diameter and the minimum diameter of the cylindrical honeycomb structure is not more than 1 mm.

36. (Amended) A honeycomb structure according to any one of claims 19-25 and 28-35, wherein the cell structure and
15 the outer wall contain kaolin and the average particle diameter of kaolin contained in the material for forming outer wall is 1/10 or more and 1/2 or less of the average particle diameter of kaolin contained in the cell structure.